

CITY OF DETROIT

LED CONVERSION

Case Study



LIGHTING THE WAY® TO A BRIGHTER FUTURE IN DETROIT, MICHIGAN

SUMMARY

In 2014, the City of Detroit's Public Lighting Authority (PLA) partnered with King Luminaire Co. Inc., a division of The StressCrete Group, to replace their aging high-pressure sodium (HPS) decorative streetlights with light-emitting diode (LED) lights. King Luminaire supplied the City of Detroit with 4,900 new decorative LED fixtures, contributing to the city's significant energy and cost savings, lowered maintenance costs, improved street lighting, and restored public trust. With its city wide conversion, Detroit has become one of the largest cities in America to be 100% lit with LED lighting.

PROJECT HIGHLIGHTS

Number of lights reduced from 88,000 to 65,000 without loss of illumination

Project Site: Detroit, MI

Payback Period: 2.3 years

Electricity Savings: 46 million kWh / year

Energy Cost Savings: \$2.9 million / year

Emission Reductions:

SO₂: 134 tons Hg: 1.48 pounds

NO_x: 41 tons CO₂: 40,418 tons

Project completed ahead of time and under budget



The dysfunctional streetlights in Detroit, August 2014
(photo: Rob Widdis, Detroit Free Press)



An example of the HPS streetlight
(photo: The StressCrete Group)

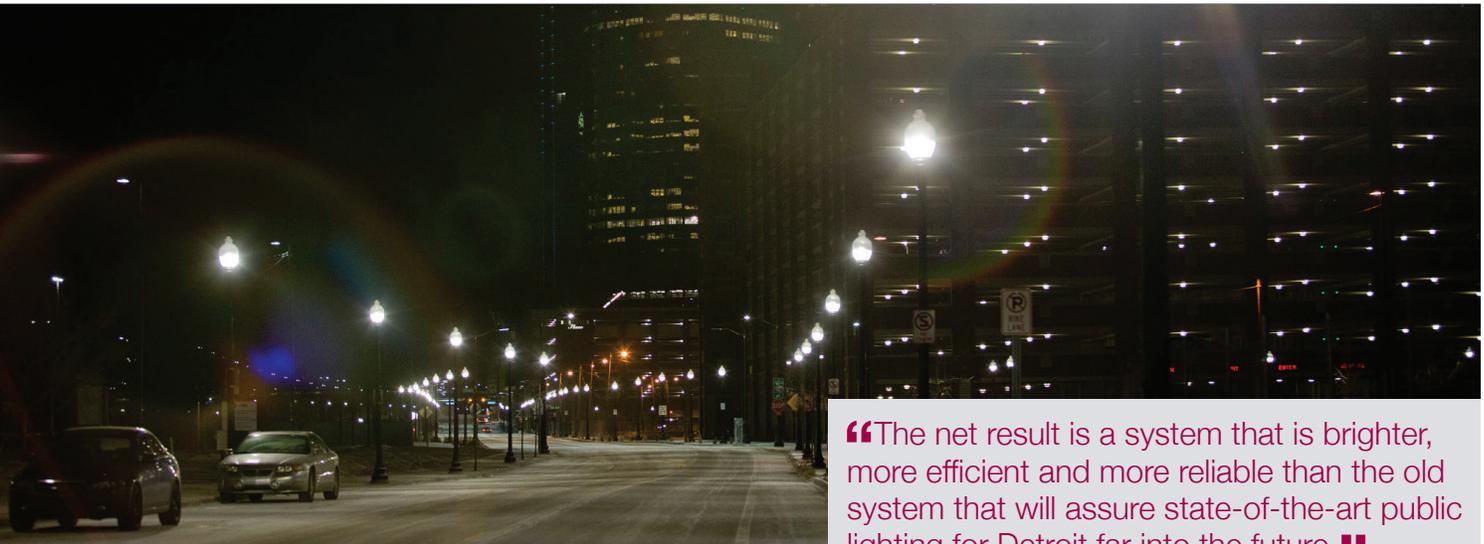
THE CHALLENGE

By mid-2013, the City of Detroit estimated that over 50% of their 88,000 streetlights were no longer functioning. A lack of funds for the upkeep of the City's infrastructure meant that many streetlights burned out without hope of replacement. Many other concerns faced Detroit's aging streetlight system including an increasing number of copper theft incidents, maintenance staff shortages, pole and substation deterioration, and an existing series-wired circuit setup, which caused all the streetlights in a circuit to go dark if one was inoperable. As a result, many residents began to avoid going out at night for fear of their personal safety; and local businesses were affected due to the decrease of foot traffic.

THE SOLUTION

After Detroit declared bankruptcy in 2013, Michigan's governor appointed an Emergency Manager tasked with establishing and overseeing the Public Lighting Authority (PLA), which aimed to restore Detroit's streetlight system.

- The conversion of an original system of 88,000 operating HPS lights to 65,000 LED lights improves illumination, maximizes energy and cost savings, lowers maintenance costs, and produces a significant reduction of environmental emissions
- The new LED lights are twice as bright as the old lights and deliver the illuminance requirements of the Detroit specification with a reduced number of streetlights while increasing energy efficiency
- The PLA partnered with King Luminaire to provide 4,900 brighter, more reliable, and more energy-efficient decorative LED light fixtures. The LED luminaires only need replacement after approximately 15-20 years, versus re-lamping the old HPS lights every 4-5 years and King Luminaire backs the LED lights with a 7-year warranty
- To improve reliability, the PLA switched from the old copper wiring to LED compatible aluminum wiring - greatly reducing theft
- In addition, the new lighting system is a multiple series circuit system – if one light goes out, the others stay on



New LED lights along Atwater Street in Detroit are bringing vibrancy back to the city, January 2017 (Photo: Laura McDermott for The New York Times)

“The net result is a system that is brighter, more efficient and more reliable than the old system that will assure state-of-the-art public lighting for Detroit far into the future.”

Public Lighting Authority, Detroit, Michigan

THE RESULTS

Electricity and Maintenance Savings:

- The new LED system saves about 46 million kWh in electricity every year, while bulb replacement frequency has been reduced by 80%

Energy Cost Savings:

- The use of LED lights delivers energy cost savings of \$2.9 million each year that results in a luminaire replacement payback period of just 2.3 years

Emission Reductions:

- The conversion to LED lights results in an annual emissions reduction of 134 tons SO₂, 41 tons NO_x, 40,418 tons CO₂ and 1.48 lb Hg

Increased Safety:

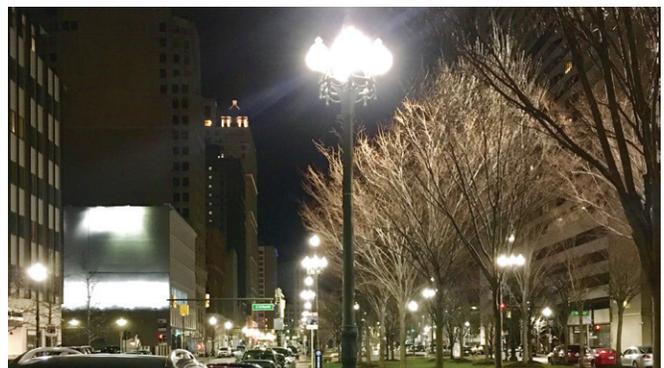
- LEDs produce bright white light — not the orange glow of sodium lights — so objects such as people and bicycles are seen more clearly
- 5,400 brighter lights along school safe routes help keep children safe on their way to and from school

Higher Foot Traffic:

- Neighborhoods have experienced an increase in foot traffic after dark — a benefit for retail businesses and restaurants

Overall:

- The entire LED conversion came in under budget and on time
- Detroit's delivery on its promise to turn the lights back on restored the trust in city government among residents



New LED lights lit up Washington Blvd. in Detroit, March 2017 (photo: The StressCrete Group)

References

- Kinzey, B. 2015. Restoring Detroit's Street Lighting System. Pacific Northwest National Laboratory. Retrieved from: https://energy.gov/sites/prod/files/2015/09/f27/2015_restoring-detroit.pdf
- Kimmelman, M. 2017. The Lights Are On in Detroit. The New York Times. Retrieved from: https://www.nytimes.com/2017/01/10/arts/the-lights-are-on-in-detroit.html?_r=0
- Public Lighting Authority. 2015. 2015: Bringing New Lights to Detroit's Neighborhoods. Annual Progress Report of the Public Lighting Authority. Retrieved from: <http://www.pladetroit.org/annual-reports-2/>



THE STRESSCRETE GROUP

With manufacturing facilities in five North American locations, The StressCrete Group produces an extensive line of high performance decorative outdoor lighting fixtures, decorative spun concrete and metal poles, plus pole arms and accessories, bollards and site amenities. We also manufacture a vast range of spun concrete poles for power distribution and transmission, sports lighting, high-mast lighting, and specialty poles for the electrical and communications industries.

We are a family business that operates by the core values of honesty, integrity, compassion and respect to better the lives of our employees, their families, our customers and the communities we represent. The StressCrete Group services multiple market segments through two divisions:

- StressCrete Ltd., established in 1953, is the longest-operating, most experienced manufacturer of spun concrete poles in North America. With plants in Alabama, Kansas and Ontario, we offer the broadest, most diverse range of spun concrete poles and bollards in the industry, with quality second to none.
- King Luminaire Co. Inc. produces a comprehensive assortment of high performance outdoor luminaires, metal poles, pole arms and accessories, plus bollards and site amenities. With an array of state-of-the-art LED Technology and HID optical systems, and plants in Ohio and Ontario, King Luminaire is a North American leader in the outdoor lighting industry.

At The StressCrete Group, we provide every customer with the highest quality innovative products and work as a team to create and maintain life-long customers through world class service.